

PHYSICS NMDCAT

TOPIC WISE TEST (UNIT-12)

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SAEED MDCAT TEAM

TOPICS:

✓ Nuclear Physics

- Q. 1** Which two nuclei contain the same number of neutrons?
- A. ${}^{12}_6\text{C}$ and ${}^{14}_6\text{C}$ B. ${}^{23}_{11}\text{Na}$ and ${}^{24}_{12}\text{Mg}$
 C. ${}^{16}_7\text{N}$ and ${}^{15}_8\text{O}$ D. ${}^{32}_{14}\text{Si}$ and ${}^{32}_{15}\text{P}$
- Q. 2** The nuclei which have different atomic numbers but equal number of neutrons are called:
- A. Isobars B. Isotopes
 C. Isotones D. Isomers
- Q. 3** The relationship between decay constant λ and half-life $T_{1/2}$ of the radioactive substance is
- A. $\lambda T_{1/2} = \ln(2)$ B. $\lambda T_{1/2} = \ln\left(\frac{1}{2}\right)$
 C. $\frac{\lambda}{T_{1/2}} = \ln(2)$ D. $\lambda = \ln(2)$
- Q. 4** The fraction of atoms of radioactive element that decays in 6 days is $7/8$. The fraction that decays in 10 days will be
- A. $77/80$ B. $31/32$
 C. $71/80$ D. $15/16$
- Q. 5** When a nucleus with atomic number Z and mass number A undergoes a radioactive decay process,
- A. Both Z and A will decrease, if the process is α decay
 B. Z will increase but A will not change, if the process is β^- decay.
 C. Z will decrease but A will not change, if the process is β^+ decay
 D. All of these
- Q. 6** The following represents a sequence of radioactive decays involving two α -particles and one β particle.
- $${}^{217}_{85}\text{At} \xrightarrow{\alpha} V \xrightarrow{\alpha} W \xrightarrow{\beta} X$$
- A. ${}^{213}_{85}\text{At}$ B. ${}^{209}_{82}\text{Pb}$
 C. ${}^{215}_{87}\text{Ir}$ D. ${}^{217}_{81}\text{Tl}$
- Q. 7** Plutonium decay with a half-life of 24000 Year. If plutonium is stored for 72000 years, the fraction of it that remains is
- A. $\frac{1}{2}$ B. $\frac{1}{3}$
 C. $\frac{1}{4}$ D. $\frac{1}{8}$
- Q. 8** The decay of a nucleus of neptunium is accompanied by the emission of a β particle and γ -radiation.

What effect (if any) does this decay have on the proton number and the nucleon number of the nucleus?

	Proton number	Nucleon number
A.	Increases	Decreases



B.	Decreases	Increases
C.	Unchanged	Decreases
D.	Increases	Unchanged

- Q. 9** If 20 g of a radioactive substance reduces to 10 g in 4 minutes, then in what time will 80 g of the same substance reduce to 10 g?
- A. 8 min
B. 12 min
C. 16 min
D. 20 min
- Q. 10** The radioactivity of a nucleus becomes $1/64$ of its initial value in 60 seconds. The half-life of nuclide is
- A. 5 s
B. 10 s
C. 20 s
D. 30 s
- Q. 11** Different radioactive materials have
- A. Same half-life
B. Different half life
C. Same total life
D. Both B & C
- Q. 12** The initial activity of a sample of a radioactive isotope containing N_0 nuclei is A_0 . What is the number of unchanged nuclei when the activity has declined to $\frac{A_0}{2}$?
- A. $0.69 N_0$
B. $\frac{0.69 N_0}{2}$
C. $\frac{N_0}{2}$
D. $\frac{N_0}{1.38}$
- Q. 13** Emission of a neutrino is occupied by the emission of:
- A. α^+
B. β^-
C. β^+
D. All of these
- Q. 14** One eighth of the initial mass of certain radioactive isotope remains un-decayed after one hour. The half-life of the isotope in minutes is
- A. 8
B. 20
C. 30
D. 45
- Q. 15** Half-life of uranoium-239 is
- A. 23.5 days
B. 23.5 minutes
C. 23.5 seconds
D. 23.5 years
- Q. 16** Which one of the following emission takes place in a nuclear reaction?
- $${}_{92}^{234}\text{Th} \rightarrow {}_{91}^{234}\text{Pa} +$$
- A. Alpha
B. Gamma
C. Beta
D. Protons
- Q. 17** There is no change in A and Z of any radioactive element by the emission of
- A. α -particle
B. γ -particle
C. β -particle
D. X-rays
- Q. 18** The number of protons in any atom are always equal to the number of:
- A. Neutrons
B. Positrons
C. Electrons
D. Mesons
- Q. 19** If the radioactive substance reduces to $\frac{1}{16}$ of its original mass in 40 days then its half-life is
- A. 10 days
B. 40 days
C. 20 days
D. 4 days
- Q. 20** The number of electrons in a nucleus X of atomic number Z and mass number A is
- A. Zero
B. Z
C. $(A - Z)$
D. A
- Q. 21** Half-life of radon gas is
- A. 1620 years
B. 23.5 minutes
C. 3.8 days
D. 4.5×10^9 years
- Q. 22** Cancerous tissue in a thyroid gland can be detected by the intake of



- A. Radio iodine
C. Radio sodium
- Q. 23** Which of given is correct relation for measuring the value of decay constant.
- A. $\lambda = -\frac{\Delta N}{N\Delta t}$
C. $\lambda = \frac{N}{\Delta N\Delta t}$
- B. Radio carbon
D. Radio phosphors
- B. $\lambda = \frac{\Delta N\Delta t}{N}$
D. $\lambda = \frac{N\Delta N}{\Delta t}$
- Q. 24** The percentage of the original of a radioactive material left after five half-lives is approximately:
- A. 1%
C. 5%
- B. 3%
D. 20%
- Q. 25** The unit of decay constant is:
- A. sec
C. sec^{-2}
- B. sec^{-3}
D. sec^{-1}
- Q. 26** cobalt-60 is used for treatment of
- A. Cancer
C. Lungs
- B. Kidneys
D. Thyroid
- Q. 27** Excessive exposure to radiation can cause damage to
- A. Living tissues
C. Organism
- B. Cells
D. All of these
- Q. 28** Radiation damage to living organism is primary due to _____ is the cells
- A. Ionization effects
C. Excitation energy effects
- B. Potential effects
D. Chemical effects
- Q. 29** Example of somatic effects are
- A. Skin burn
C. Drop in the white blood cells
- B. Loss of hair
D. All of these
- Q. 30** The genetic effects may become apparent after a
- A. Short time
C. Long time
- B. Medium time
D. All of these
- Q. 31** Phosphorus-32 is used for
- A. Blood cancer
C. Bone cancer
- B. Skin cancer
D. All of these
- Q. 32** The half-life of radium is 1600 years. The fraction of radium atoms that remain undecayed after 4800 years will be
- A. $\frac{1}{4}$
C. $\frac{1}{8}$
- B. $\frac{1}{16}$
D. $\frac{1}{32}$
- Q. 33** Nuclei having the same mass number but different atomic number are
- A. Isotopes
C. Isotones
- B. Isobars
D. Isomers
- Q. 34** How many neutrons are there in the nuclide ${}^{66}_{30}\text{Zn}$?
- A. 25
C. 36
- B. 30
D. 66
- Q. 35** The three isotopes of uranium are
- A. U^{238} , U^{239} and U^{235}
C. U^{238} , U^{239} and U^{236}
- B. U^{228} , U^{239} and U^{235}
D. U^{238} , U^{229} and U^{235}
- Q. 36** Half-life of radium is 1590 years. In how many years shall the earth loss all its radium due to radioactive decay?
- A. 1590×10^6 years
C. 1590×10^{24} years
- B. 1590×10^{12} years
D. Never
- Q. 37** If $\frac{15}{16}$ of radioactive atoms decays in 16 hours. The half-life of element is



- A. 16 hours
C. 4 hours
- B. 8 hours
D. 2 hours
- Q. 38 Tungsten-176 has a half-life of 2.5 hours. After how many hours will the disintegration rate of a tungsten-176 sample drop to $\frac{1}{16}$ its initial value?
- A. 5
C. 10
- B. 8.3
D. 13
- Q. 39 When an animal dies each gram of carbon in its body emits about 16β particles each minute. Each gram of carbon from same animal remains is found to emit 4β particles per minute. How old is the animal (Half-life of radioactive carbon is 6000 years)?
- A. 3000 years
C. 12000 years
- B. 6000 years
D. 18000 years
- Q. 40 The half-life of a certain element is 3.5 days at S.T.P. If the temperature is doubled and pressure is reduced to half then half-life of the same element will be
- A. 1.75 days
C. 3.5 days
- B. 7 days
D. 14 days
- Q. 41 ${}_{92}\text{U}^{238}$ nucleus emits two α -particles and two β -particles and transforms into a thorium nucleus. Which of the following is the mass number and atomic number of the thorium nucleus so produced?
- A. 230, 90
C. 230, 88
- B. 234, 90
D. 234, 88
- Q. 42 The decay constant of radium is 4.28×10^{-4} per year. Its half-life will be
- A. 1240 years
C. 1620 years
- B. 2000 years
D. 63 years
- Q. 43 The decay constant of a radioactive element is 0.01 per second. Its half-life period is
- A. 0.693 sec
C. 6.93 sec
- B. 69.3 sec
D. 693 sec
- Q. 44 The half-life period of a radioactive substance is 5 min. The amount of substance decayed in 20 min will be
- A. 75%
C. 93.75%
- B. 25%
D. 6.25%
- Q. 45 The half-life of the isotope ${}_{11}^{24}\text{Na}$ is 15 hours. How much times does it take for $\frac{7}{8}$ th of a sample of this isotope to decay?
- A. 75 h
C. 55 h
- B. 65 h
D. 45 h
- Q. 46 What fraction of a radioactive material will get disintegrated in a period of two half-lives?
- A. Whole
C. One-fourth
- B. Half
D. Three-fourth
- Q. 47 The half-life of a radioactive element which has only $\frac{1}{32}$ of its original mass left after a lapse of 60 days is:
- A. 12 days
C. 60 days
- B. 32 days
D. 64 days
- Q. 48 If the half-life of a radioactive material is 100 days, then its half-life after 10 days will become:
- A. 50 days
C. 400 days
- B. 200 days
D. 100 days
- Q. 49 If T is the half-life of a radioactive material, then the fraction that would remain after a time $\frac{T}{2}$ is
- A. $\frac{1}{2}$
B. $\frac{3}{4}$
C. $\frac{1}{\sqrt{2}}$
D. $\frac{\sqrt{2}-1}{\sqrt{2}}$
- Q. 50 A radioactive element emits 200 particles per second. After three hours 25 particles per second are emitted. The half-life period of element will be



KIPS ENTRY TESTS
PREPARATION



A. 50 minutes

B. 60 minutes

C. 70 minutes

D. 80 minutes

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Physics Test 12 Key

ANSWER SHEET

1) B

2) C

3) A

4) B

5) D

6) B

7) D

8) D

9) B

10) B

11) D

12) C

13) C

14) B

15) B

16) C

17) B

18) C

19) A

20) A

21) C

22) A

23) A

24) B

25) D

26) A

27) D

28) A

29) D

30) C

31) C

32) C

33) B

34) C

35) A

36) D

37) C

38) C

39) C

40) C

41) A

42) C

43) B

44) C

45) D

46) D

47) A

48) D

49) C

50) B

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